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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,600

08/14/2007

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EXAMINER

WOODARD, JOYE L

ART UNIT

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1797

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08/20/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,600	Applicant(s) LOHBERG, WERNER	
	Examiner JOYE WOODARD	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/14/2007</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 08/14/2007 fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement.

2. The prior art submitted by applicant on 08/14/2007 has been considered and listed on the PTO-892.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the socket (2) of claim 18 and the bolts of claim 20 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not

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be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The apparatus claims, as presently drafted, are somewhat narrative in form and fail to positively set forth the elements and point out their structural relationship to each other so as to clearly define the scope of the claimed “regenerator of combustion gases.” For example, claim 1 in line 1 of claim 1, “with an exhaust gas catalytic converter” does not positively set forth the catalytic converter. In line 2, there is insufficient antecedent basis for “the hot operated catalytic converter” and “adjoins to a high temperature resistant diffusion-membrane” does not positively set forth the

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membrane. In line 3, "which, then again, adjoins to a reclaim collector" is narrative and fails to positively set forth the "reclaim collector" nor is the structural relationship of this "reclaim collector" to the membrane clearly defined. Line 4 lacks antecedent basis for "the pressure". Line 5 lacks antecedent basis for "the thus accumulating reclaim gas". In line 5, please note that the combustion unit is not positively set forth, and in line 6, "upstream of the regenerator" implies that the combustion unit is not an element of the claimed "regenerator of combustion gases". All of the claims use the phrase "characterized by the fact" rather than standard format such as "comprising" used in claim drafting in the United States.

In claim 2, line 1, in order for proper antecedent basis to be present, the "diffusion membrane" is lacking the hyphenated form used in claim 1. Please see dependent claims 3-7, 10 and 18 also. In claim 3, line 2, a "/" should be inserted between "and or". In claim 5, line 2, parentheses must enclose reference character "R", the "the walls" lacks antecedent basis from claim 1. In claim 6, line 2, reference character R is used in the specification and drawings to designate a frame. Claim 8 lacks antecedent basis for "the wall", "the thick-walled side" and "the frame". Claim 10 uses idiomatic language. "Coated with a catalyst metal" should be changed to "coated with a metal catalyst". Claim 11 fails to positively set forth the insulating layer. Claim 12 has insufficient basis for "the combustion unit" from claim 1 for the reasons set forth above with respect to claim 1. See claims 13-15 and 17 also. Claim 12 fails to set forth any structure necessary to enable air/fuel supply and does not positively set forth the remaining structural elements or provide a structural relationship necessary to

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define the scope of the apparatus. Claim 13 recites procedural limitations only and clearly fails to define the structural elements and define a structural relationship with previously defined elements that would enable such procedural steps. Claim 17 has no antecedent basis for “the reclaim gas”, and again, fails to positively set forth the remaining structural elements (intake duct/reclaim pipe) or Claim 18 fails to positively set forth the structural elements (metal sockets/mounting plate) or provide a structural relationship necessary to define the scope of the apparatus. Claim 19 fails to refer to “the socket”. Claim 20 has no antecedent basis for “the reclaim collector” since this feature was not positively recited as comprising a part of the structure of claim 1, and “is bolted”, as functionally recited in line 2, fails to positively set forth any bolts.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 2, 5-8 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammer (DE 100 19 007 A1). Hammer shows an apparatus comprising a hydrogen separator (40) having a high temperature resistant membrane (42) including a ceramic substrate located in a wall of an inner chamber (10). The separator is operated under over-pressure conditions for separating hydrogen for collection in chamber (10) for use as a fuel (6) in an engine (13). Hot combustion gases from the engine are exhausted through a pipe (21) which is adjoined to the hydrogen separator (40) as shown in Figure 2. While Hammer does not disclose the use of a metal catalytic convertor in the exhaust line, concern over emissions is noted in the abstract. Catalytic conversion of exhaust gases produced by combustion, prior to atmospheric discharge, by direct contact with a metal catalyst is notoriously old in the art for the purpose of reducing exhaust gas emission of pollutants, as noted on page 1 of applicant's specification. Accordingly, to have modified Hammer by including a catalytic converter in the exhaust line (21) for the purpose of reducing emission of pollutants prior to exhausting the combustion gases would have been obvious to one skilled in the art. With respect to claim 11, please note conventional catalytic converters include insulation material between the catalyst carrier and the surrounding housing in which the carrier is mounted. With respect to claim 5, welding of the membrane casing (10) to the wall of the modified Hammer exhaust pipe (21) would have been a common mounting technique obviously available to one skilled in the art to support the casing to the pipe. While

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Hammer does not show tapering the length of the membrane in the direction of hydrogen outlet (45) as recited in claim 6, absent any unexpected results, such would have been an obvious design choice not producing any unexpected results. With respect to claim 7, note the catalytic form (43) is inherently porous/perforated in order to allow gas flow there through and passage of hydrogen through the membrane. With respect to claim 8, Hammer discloses on page 1, paragraph 2 that it is known to heat the catalyst (43) during cold start using a power source, but notes that a disadvantage of such is power consumption. Accordingly, it would have been obvious to use conventional heating means in combination with Hammer, such as the claimed glow plugs, for use in cold starts notwithstanding increasing power costs. With respect to claim 12, Hammer shows a lambda sensor (14) located in the exhaust pipe and a control unit (20) connected to fuel supply valves (8/9) and water supply valve (3). While a controlled supply of combustion air to the engine is not shown as required in claim 12, a controlled air supply for combustion would have been obvious to one skilled in the art for controlled combustion in Hammer in the same manner as the controlled fuel supply. With respect to claim 13, see water supply valve (3) and note the recycle stream (8) contains water vapor. With respect to claim 15, location of the air supply means would obviously be located upstream of the combustion engine so that combustion of the fuel could take place and produce the hot exhaust gases. With respect to claim 16, silencers or mufflers are commonly located downstream of catalytic converters for noise reduction of exhaust gases prior to release to the atmosphere. Inclusion of a muffler in the

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modified Hammer apparatus prior to release of the exhaust gases would have been obvious to one skilled in the art for noise reduction. With respect to claim 17, see pipe (10) as shown in Fig. 1.

9. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammer (DE 100 19 007 A1) as applied to claims 1, 2, 5-8 and 11-17 above, and further in view of Abe (US 4865630). With respect to claims 3 and 4, the claimed ceramic substrates are very common in the art as noted in the abstract of Abe for porous membrane production purposes, and would have been an obvious ceramic material for use as the ceramic substrate in Hammer.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hammer (DE 100 19 007 A1) as applied to claims 1, 2, 5-8 and 11-17 above, and further in view of Fedor (US 3998599) or Cornelier (US 1595711). Baffle plates located at the upstream and downstream ends of the catalytic carriers of catalytic converters is common for mounting purposes, end face protection and flow direction control as shown in Fedor (31) or Cornelier (3). Accordingly, to have provided such means, as recited in claim 9, as a means for mounting of the catalytic carrier body in the modified apparatus of Hammer would have been obvious to one skilled in the art.

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hammer (DE 100 19 007 A1) as applied to claims 1, 2, 5-8 and 11-17 above, and further in view of Abe et al. (US 4280926) or Toh et al. (US 4220625). Catalytic carrier bodies in the form of lamellated blocks, having passages located between the individual plates coated with metallic catalysts are conventional

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arrangements in the art as shown in Abe et al. (column 6, lines 7-15) or Toh et al. (column 5, lines 15-27). Accordingly, providing a conventional catalytic carrier, such as that recited in claim 10 and shown in Abe et al. or Toh et al., in the modified apparatus of Hammer would have been obvious to one skilled in the art. Please note that a lamellated block, by common definition, comprises lateral division of distinct plates having flow ducts located there between.

12. Claims 18 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammer (DE 100 19 007 A1) as applied to claims 1, 2, 5-8 and 11-17 above, and further in view of Frost et al. (US 2002/0124723). The Hammer disclosure does not provide much elaboration on the specific design of the membrane arrangement encircling the exhaust gas pipe (21). It is known to use multiple assemblies (10) comprising multiple membranes (38,62) interconnected using a serial arrangement of retainer plates (12,20) and gaskets (16, 30) as best shown in Fig. 6 of Frost et al. for separating hydrogen from a mixture of gases containing hydrogen. The individual assemblies are retained at their outer edge by brazing or forming a weld joint (74). To have modified the hydrogen separator (40) of Hammer by including multiple membranes, in a manner taught by Frost et al., in the inner chamber (10) of Hammer would have been obvious to one skilled in the art with the expectation of producing additive hydrogen separation and recovery results, if any. With respect to claim 13, modifying the welding manner of securement by bolting the individual assemblies together and to the exhaust pipe and chamber wall (40) would have been obvious to one skilled in the art for attaching the various parts together.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Docter et al. (US 6698190) has been cited of interest to illustrate the use of a glow plug (10) for electrically preheating the reforming catalyst during cold start up only. EP 1359310A1 has been cited of interest to show an apparatus for generating hydrogen in combination with a gas engine. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOYE WOODARD whose telephone number is (571)272-6246. The examiner can normally be reached on Monday - Friday from 0900 to 1700, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden, can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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